

Workshop on Xenon Detector $0\nu\beta\beta$ Searches: Steps Towards the Kilotonne Scale

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Type: **Invited talk**

Xenon-Doped Liquid Argon TPCs as a Neutrinoless Double Beta Decay Platform

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Next-generation large liquid argon time-projection chambers offer an unprecedented amount of active detector mass in a deep location. Modifications to the detector design could enable neutrinoless double beta decay searches, with the possibility of reaching the normal ordering region. These modifications include adding external neutron moderation, filling the detector with argon depleted in Ar42, doping with xenon, and a method to achieve percent-level energy resolution at the MeV scale. One way to achieve this desired level of energy resolution is to introduce a photosensitive dopant into the argon, converting the isotropic scintillation photons into a directional ionization signal. This would enhance the achievable energy resolution in large LArTPCs, and would lead to sizeable improvements to many facets of the broad physics program such a detector could offer.

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